

AUSTRALIAN BEES IN THE MUSEUM OF
COMPARATIVE ZOOLOGY.

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Having undertaken to prepare a manual of Australian bees for the Royal Zoölogical Society of New South Wales, I have been obliged to examine the undetermined material existing in various museums, in America and Australia. This task proves heavier than was anticipated, owing to the large number of specimens and species submitted. The Australian bee-fauna is extremely rich, as might be expected from the nature of the flora, and when I have done the best I can, there will still remain hundreds of species to be discovered and described.

Apis mellifera ligustica Spinola

Babinda, April 8; Halifax, June 1. Collected by F. X. Williams. Not native in Australia. In the Australasian Beekeeper, XXVII, Oct. 15, 1925, p. 68, Mr. T. Raymend published a supposed native Australian species, *A. ænigmaticus* (on p. 69 called *A. trigona*), said to occur in Victoria and S. Australia. Apparently no specimens are extant, and nothing is known except the comb.

Lestis bombylans (Fabr.)

2 ♀, Cooktown, Queensland (*E. A. C. Olive*).

Mesotrichia bryorum (Fabr.)

2 ♀, Halifax, July 11 (*Williams*).

Crocisa lamprosoma Boisduval

Halifax, June (*Williams*).

Crocisa omissa Cockerell

Seven from Halifax, May 9—June 20 (*Williams*). 1 ♀
Sydney, Feb. 28 (*Williams*).

Crocisa rotundata Friese

One from Melbourne (*Hy. Edwards*).

Anthophora cingulata (Fabr.)

♀, Halifax (*Williams*); ♀, Cairns (*Williams*); ♂,
"Palm Island to Cooktown" (*A. G. Mayer*) *A. emendata*
Sm. is a synonym.

Anthophora chlorocyanea Cockerell

1 ♂, 1 ♀, S. Australia (*H. Edwards*). In the female
the scape is all black; in the male none of the ventral
segments is emarginate, but the scape has a light mark.

Anthophora zonata (L.)

In 1921 I treated the common variable species of Queens-
land as *A. pulchra* Sm., which is its name if separated from
A. zonata; but it now seems impracticable to recognize two
species. In the males the face may be light yellow or white.

4 ♀, 4 ♂, Halifax (*Williams*); 2 ♀, 1 ♂, Mossman
(*Williams*); 1 ♀, 2 ♂, Babinda (*Williams*).

Anthophora salteri Cockerell

1 ♀, with light face-markings white. Sydney, N. S. W.,
Feb. 28—March 8, 1919 (*Williams*).

Hyleoides concinnus (Fabr.)

Sydney, N. S. W. (*Williams*).

Coelioxys albolineata Cockerell

3 ♀, Halifax, and 1 ♀, Cairns (*Williams*).

Coelioxys albolineata var. *darwiniensis* Cockerell

1 ♀, Halifax, June (*Williams*). The femora are bright
red.

Megachile mystacea (Fabr.)

3 ♀, 2 ♂, Halifax (Williams); 1 ♀, Brisbane, March 24 (Williams).

Megachile ustulatiformis Cockerell

2 ♂, Halifax, June 1-17, and June 20-July 9. (Williams).

Megachile hilli Cockerell

2 ♀, Halifax, June 1-17 and July 11-20 (Williams). When describing *M. hilli*, I wrote: "I had to consider whether this could be the female of *M. ustulatiformis*, and, while this is possible, it appears improbable." The present specimens, collected in the same locality, lend support to the view that these are sexes of one species.

Megachile pictiventris Smith¹

1 ♀, Babinda, April 18 (Williams).

Megachile cincturata Cockerell

2 ♀, Cairns, April 1-12 (Williams).

Megachile ignescens Cockerell

1 ♀, Halifax, June 1-17 (Williams). This had been labelled *pictiventris*, but is easily separated by the abdominal hair-bands.

Megachile lucidiventris Smith

1 ♀, Sydney, N. S. W. (Williams). This is very like *M. suppressipennis* Ckll., but easily separated by the denticulate lower margin of clypeus.

¹Reviewing my material of *M. pictiventris*, I find I have confused with it a different ♀, taken by Turner at Mackay, Queensland, in January, 1900. It is distinctly more robust, and the beautifully metallic (green and purple) abdomen has white hair-bands, weak or failing in middle. The light hair of face is white (not at all yellowish), and the abdomen, seen from above, shows no outstanding black hairs toward the apex; characters which separate it at once from *M. ignescens*. This beautiful species may be called *Megachile rowlandi* n. sp., after Rowland Turner.

Megachile viridinitens n. sp.

♀. Length about or nearly 15 mm.; a parallel-sided black species, metathorax and base of abdomen densely covered with white hair, ventral scape entirely black, hair of legs black, wings dark fuscous except basally. The appearance is exactly that of *M. fumipennis* Smith, and I had hastily assumed it to be identical until I noticed the following differences: middle of lower margin of clypeus with two little shining tubercles; hair of face entirely black; no white hair on prothorax (except fringing tubercles) and no converging lines of white hair on anterior part of mesothorax; mesothorax finely punctured, the posterior middle minutely rugosopunctate; abdominal segments 1 to 4 strongly green, the callosities sublaterally shining, with sparse, strong punctures. Cairns, Queensland (*W. M. Wheeler*).

Megachile chrysopyga Smith

1 ♂, 3 ♀, Sydney, N. S. W. (*Williams*); Melbourne (*H. Edwards*).

Megachile quinquelineata Cockerell

Mr. F. X. Williams took females at Halifax, July 11-20; Cairns, April 1-12; Babinda, April 18; Mossman, April 24.

Megachile ciliatipes Cockerell

Mr. Williams took males at Halifax, July 11, and Babinda, April 16 and 18. It seems very likely that this is the male of *M. quinquelineata*, but I find that it is practically identical with the male of *Androgynella detersa* (Ckll.). The female *A. detersa* has no ventral scape; it cannot be a mutant from *M. quinquelineata* directly, because the last tergite is covered with pale hair, whereas in *M. quinquelineata* this is not the case.

Megachile gilbertiella Cockerell

1 ♀, Halifax, July 11-20 (*Williams*). This specimen has the red of fifth tergite confined to the apical margin.

Megachile rhodogastra Cockerell

♂. Length about 10 mm.; black, parallel-sided, rather robust; face with much creamy-white hair, cheeks with long pure white hair; antennæ long, black, the flagellum very faintly reddish beneath; mandibles black; clypeus very densely punctured, without a smooth line; mesothorax dullish, extremely densely and finely punctured; scutellum closely punctured; hair of thorax white, but some black on scutellum, as also on vertex; tegulæ very dark rufous; wings brownish, especially stained along the veins; first recurrent nervure twice as remote from base of second cubital cell as second from apex; legs black, tibiæ swollen, anterior coxæ not spined, anterior tarsi simple, middle tarsi with long grey hair behind, hind tarsi with very bright red hair on inner side; apical part of abdomen with tegument red.

3 ♂, Halifax, May 9-15, and June 1-17 (*Williams*). The above descriptive notes are from one of the specimens which seemed to be different, having the hind tarsi with bright ferruginous hair, and lacking the thick black fringe posteriorly. After close study, I conclude that there is only one variable species, but the matter deserves further study in the field.

Megachile cetera Cockerell

1 ♀, Halifax, June (*Williams*).

Nomia tomentifera Friese

8 ♀, 1 ♂, Babinda, April 8-16 (*Williams*); 1 ♀, Kuranda, April 16 (*Williams*).

Nomia darwinorum Cockerell

6 ♂, 2 ♀, Halifax, May 9-15, June 1-17 (*Williams*); 2 ♀, Babinda, April 18 (*Williams*). This is precisely *N. darwinorum*, described from the male, collected by Turner at Port Darwin. The female agrees with the earlier described *N. rubroviridis* Ckll., from the northwest coast, except that the flagellum is variably reddened beneath, and the hair of the apical tergites is very dark fuscous, not

ochreous. I think *N. darwinorum* is surely not more than a race of *N. rubroviridis*, but it is desirable to see the male of the latter.

Nomia halictella Cockerell

1 ♀, Mossman, April 24 (*Williams*); 1 ♀, Cairns, May 18 (*Williams*).

Nomia triangularis (Cockerell)

11 ♀, 2 ♂, Halifax, May and June (*Williams*); 1 ♀, Babinda, April 18 (*Williams*). The male was described by me as *N. pseudoceratina*. I described the female in 1905 as *Nomia halictella* var. *triangularis*; in addition to the differences cited, may be mentioned the darker tegulæ and tarsi. I feel sure I now have the sexes correctly associated, and it is evident that the species is quite distinct from *N. halictella*.

Nomia australica Smith

1 ♀, Melbourne (*H. Edwards*), has both clypeus and scape black. 1 ♂, S. Australia (*H. Edwards*), has scape clear red, black at end, but another with same data has the scape darker only faintly reddened. 3 ♂, Melbourne (*H. Edwards*).

Nomia frenchi Cockerell

1 ♂, Melbourne (*H. Edwards*); 2 ♂, S. Australia (*H. Edwards*).

Nomia gilberti Cockerell

1 ♀, Halifax, June or July (*Williams*).

Nomia flavoviridis Cockerell

1 ♂, Halifax, June; 40 ♂, 4 ♀, Babinda, April. All taken by *Williams*.

Nomia williamsi n. sp.

♂. Length about 7.3 mm., anterior wing 5.4 mm.; black with white hair; mandibles dark rufous apically, face rather broad, densely covered with white hair; scape entirely black (in *N. argentifrons* Sm. it is rufotestaceous in front); flagellum long, reaching scutellum, black above, dull red beneath; mesothorax and scutellum closely punctured; postscutellum with dense white (not at all fulvous) tomentum; area of metathorax broadly triangular, densely rugosoplicate, dull; sides of metathorax dull, except a broad shining band just below sides of area; mesopleura dull, anteriorly with white tomentum; tegulæ clear testaceous; wings hyaline, the apical region faintly clouded; stigma large, light orange fulvous, nervures pale testaceous; legs reddish black, with the knees bright ferruginous, tibiæ red at extreme apex, tarsi pale reddish, the basitarsi more whitish; hind legs not modified; abdomen moderately shining, hind margins of first two tergites reddened; apices of segments with rather narrow bands of dense white hair, broadly interrupted on first two; venter simple, except for a large patch of pale fulvous-tinted tomentum.

Halifax, June 1-17, 1919 (*F. X. Williams*). Very close to *N. halictella* Ckll., but smaller, with white instead of fulvous hair, and darker flagellum.

Nomia babindensis n. sp.

♀. Length about 6 mm., anterior wing 4.4; robust, indigo blue, the abdomen mainly black, but blue on first tergite and in the apical depressions of the others, second tergite with a shining brown hind margin. Head broad, face with very thin dull white hair, vertex with very long erect black hair; mandibles rufescent at apex; clypeus shining, broadly black apically, bigibbous, with a median depression; supraclypeal area with a shining median pale, slightly pinkish, band; front dull; antennæ dark; a little black hair on scutellum, but thorax above very bare; mesothorax dullish, minutely punctured; scutellum weakly bigibbous; area of metathorax short, dull, very finely sculptured; mesopleura shining blue in middle; tegulæ very dark

brown; wings greyish hyaline, stigma small, dark brown; second cubital cell nearly square; first recurrent nervure meeting second intercubitus; legs brownish black, with pale hair; hind margins of tergites with short pale hair, not forming conspicuous bands.

Babinda, Queensland, April 8-16, 1919 (*Williams*). Readily known among the metallic species by the small size and blue color, with dark tegulæ and mainly black abdomen.

Meroglossa chiropterina n. sp.

♀. Length about 7.5 mm.; robust, black, with the light markings of head and thorax bright chrome yellow, consisting of face, and broad lateral marks going nearly up to level of end of scape, tubercles and quadrate spot behind, axillæ, scutellum and postscutellum; clypeus with a shield-like elevation, much longer than broad, the sulcus on each side of it black; supraclypeal mark a narrow triangle in middle of supraclypeal area, or it may be absent, and the clypeal yellow may be strongly notched above in middle; mandibles, molar space and cheeks black; scape swollen, ferruginous, black above at apex; flagellum black above, light ferruginous beneath; mesothorax dull and very densely punctured; tegulæ black; wings hyaline, with dull ferruginous stigma and nervures; first recurrent nervure meeting first intercubitus; legs black; abdomen black, simple, closely punctured.

3 ♂, Halifax, June 1-17, 1919 (*Williams*). In structure more like *M. eucalypti* Ckll., but by the black abdomen more like *M. sculptissima* Ckll. These bees belong to the subgenus *Meroglossula* Perkins. The specific name is derived from the resemblance of the face to that of a bat.

Palæorhiza disrupta (Cockerell)

Five from Babinda, April 16; one from Halifax, May 9-15; all collected by *Williams*. The Babinda specimens vary in the markings of the postscutellum which may be all green, to yellow with a green central band.

Hylæus alcyoneus robustus Cockerell

Two males from Sydney (*Williams*). One of these is intermediate between the type and var. *robustus*, having the ventral processes small.

Hylæus cyaneomicans (Cockerell)

Females were collected by *Williams* as follows: 2, Babinda, April 18; 1, Cairns, May 18; 18, Halifax, June, July.

Hylæus rotundiceps (Smith)

♀, Sydney (*Williams*).

Hylæus frederici (Cockerell)

♀, Southerland, N. S. W., Nov. 14 (*W. M. Wheeler*).

Hylæus eburniellus (Cockerell)

♀, Sydney, Feb.—March (*Williams*).

Hylæus brevior (Cockerell)

A male from Sydney, Feb. 28—March 8 (*Williams*).

Euryglossina perpusilla (Cockerell)

Two from Sydney, Feb. 28—Mch. 8 (*Williams*).

Euryglossina chalcosoma (Cockerell)

One from Sydney, Feb. 28—Mch. 8 (*Williams*) has the mesothorax strongly suffused with purple, but certainly belongs to this species.

Trigona carbonaria Smith

Fourteen from Halifax, six from Babinda, one from Cairns, and one from "Cordelia Hill, 600 ft., Halifax," all collected by *Williams*. These Queensland specimens mostly have the flagellum clear red beneath, but do not have the

black hair scutellum which characterizes subsp. *hockingsi* Ckll., from the Cape York Peninsula.

Allodape simillima Smith

Eight from Halifax, June 17 (*Williams*).

Exoneura bicolor Smith

♀, Melbourne (*H. Edwards*).

Exoneura hamulata Cockerell

Females of this variable species from Australia (*H. Edwards*), Hornsby, N. S. W. (*Wheeler*) and Melbourne (*H. Edwards*).

Binghamiella antipodes (Smith)

4 ♀, 4 ♂, Sydney (*Williams*). 1 ♀, Melbourne (*H. Edwards*). For an interesting discussion of this species, see Raymend, *Victorian Naturalist*, Jan., 1929, p. 240, and a plate showing the structural features.

Paracolletes flavomaculatus Cockerell

Two females, Kuranda, Queensland (*Wheeler*).

Paracolletes fimbriatinus Cockerell

Male, Melbourne (*H. Edwards*).

Paracolletes semipurpureus (Cockerell)

♀, Southerland, N. S. W., Nov., 1914 (*Wheeler*). The color of the abdomen varies; in this specimen it is yellowish green.

Paracolletes hackeri Cockerell

♀, Sydney, Feb. 28—March 28 (*Williams*).

Paracolletes carinatus (Smith)

♀, Southerland, N. S. W., Nov., 1914 (*Wheeler*).

Paracolletes carinatus Cockerell

♂, Halifax, June, and Sydney, Feb. 28—March 8 (*Williams*). These differ from the type in having the head and thorax bluish-green, the scutellum and metathorax quite blue. Noteworthy characters for the species are the polished green clypeus, dark antennæ (slightly reddened apically), pale thoracic pubescence and mainly red legs.

Sphecodes profugus Cockerell

3 ♀, 4 ♂, Halifax, May and June, one male as late as July 11-20; 1 ♀, Cairns, April. All collected by *Williams*. The male has the antennal segments strongly nodose; the abdomen has the first three segments red, the others black.

Nomioides perditellus Cockerell

1 ♂, Babinda, April 18. (*Williams*).

Parasphecodes arciferus Cockerell

2 ♂, Melbourne (*H. Edwards*). This sex is new; it has the ventral tubercle on abdomen just as in the female. Clypeus with a central pit, and with its apical portion very broadly dull yellow, this color extending upward in median line as a pointed projection. Antennæ long, reaching base of metathorax, black. First three abdominal segments dark chestnut red, the others black. Legs black.

Halictus urbanus Smith

♀, Sydney, Feb. 28—March 8 (*Williams*).

Halictus murrayi Cockerell

♀. Small (anterior wing 3.4 mm.), or rather larger; thorax usually purple blue, varying to blue-green; tegulæ rufous; legs black; abdomen shining black; area of meta-

thorax more or less distinctly plicatulate. This is not *H. urbanus* var. *stradbrokensis* Ckll., which is larger, with dark tegulæ, and area of metathorax regulose, not plicate. *H. urbanus* is a puzzling species, running into a number of local races, and *H. murrayi* is certainly very closely allied.

Queensland; 10 ♀ from Babinda, April 8-16, 1919 (*Williams*); and one from Halifax, June 17 (*Williams*). *H. murrayi* was described from the Northern Territory: it now appears more widely distributed and variable than was supposed.

Halictus subcarus n. sp.

♀. Length about 5 mm., anterior wing about 3.5; head rather broad, dark green with fine white pubescence on face and front; mandibles red except at base; clypeus shining, the apical half black, with a few very large punctures; supraclypeal area and front dull; flagellum bright ferruginous beneath; mesothorax and scutellum bright prussian green, the former dull, the latter more shining, but not polished; metathorax dark green, the basal area with short but strong plicæ, the margin of the area thickened, obtuse, blackish; pleura dark green; tegulæ clear fulvous; wings hyaline, stigma dark reddish, nervures pale reddish, outer recurrent and intercubitus colorless and almost obsolete; second cubital cell higher than broad; femora black, with knees red; tibiæ and tarsi bright ferruginous; hind spur with two large long spines; abdomen olive green, with fine pale pubescence, hind margins of tergites reddened; venter with much white hair. Under the microscope, the mesothorax is seen to be minutely tessellate and finely punctured, and the front below the ocelli is longitudinally striate. The face is conspicuously narrower than in *H. williamsi*, and the clypeus is more produced. It is easily known from *H. floralis* Sm. by the dull scutellum.

3 ♀, Halifax, Queensland (*Williams*). The type July 11-20, 1915; two others June 20—July 9, 1919. From *H. pavonellus* Ckll. it is known by the larger head, with more produced clypeus, green mesothorax and clear red hind tibiæ.

Halictus williamsi n. sp.

♀. Length about 5.5 mm., anterior wing about 3.7; head broad, round seen from in front, very dark green, with thin hoary pubescence on face and front; mandibles bright red apically; clypeus dull, with very dense lineolate-reticulate sculpture; supraclypeal area brassy, also with lineolate sculpture, but a little more shining; front dull; antennæ black, the flagellum obscurely reddish beneath apically; mesothorax and scutellum dull, yellowish green; metathorax dark green, the rather large basal area coarsely plicate, with heavy obtuse margin, which is microscopically sculptured all over; tegulæ clear fulvous; wings hyaline, faintly dusky; stigma dark brown, nervures brown, outer recurrent and intercubitus almost obsolete; second cubital cell broader than high; femora black, knees, tibiæ and tarsi bright ferruginous; hind spur as in *H. subcarus*; abdomen very broad, shining black conspicuously but thinly pruinose-pubescent, especially on apical part; hind margins of tergites coppery reddish; surface of tergites microscopically transversely lineolate, and with perhaps a faint metallic cast; venter with much white hair. ♂, Much smaller and more slender, length hardly 3.5 mm., antennæ black, flagellum not very long; no light mark on clypeus; mesothorax dull olive green, scutellum more shining; abdomen narrower.

Queensland (*Williams*). 1 ♀, Halifax, June 20—July 9; 1 ♂, Babinda, April 8-16, 1919.

Female *H. williamsi* is easily known from *H. mundulus* Ckll. by the dark stigma, and from *H. urbanus* Sm. by the color of mesothorax and appearance of the abdomen. The male may be compared with *H. hackeriellus* Ckll., from which it is known at once by the red tibiæ, and dull dark front of head.

Halictus stirlingi Cockerell

2 ♀, Babinda, April 8-16 (*Williams*).

Halictus lanarius Smith

Males, Halifax, July 11 (*Williams*) and Australia (*H. Edwards*).

Halictus blackburni Cockerell

Five females, Halifax, June and July (*Williams*).

Halictus sturti Cockerell

1 ♀, Halifax, June 17 (*Williams*).

Halictus mesembryanthemi Cockerell

♂, Halifax, July 11 (*Williams*); tarsi reddened by cyanide.